

NEW PATENTS

METALS AND ALLOYS

Production of Platinum-Manganese-Antimony Thin Film

MATSUSHITA ELEC. IND. K.K. *Japanese Appl.* 63/452
Production of a Heusler's alloy thin film is achieved by arranging 3 targets of Pt, Mn and Sb to focus onto a quartz glass substrate, and performing magnetron sputtering. This is done simultaneously by ion bombardment to form an oriented Pt-Mn-Sb thin film.

Sulphurisation Resistant Silver Alloy Containing Platinum

SEIKO EPSON K.K. *Japanese Appl.* 63/14,830
A hard Ag alloy used for ornamental wares contains (by wt.) 80-93% Ag, 0.2-15% Pt, 1-5% Ge, and at least one of 0.2-15% Pd, 0.1-5% Ir, 0.2-15% In, 0.1-10% Zn and 0.1-7% Sn. The Ag alloy has improved resistance to black discolouration on sulphurising by adding Pt, and improved hardness by precipitation of Ge due to age hardening.

CHEMICAL COMPOUNDS

Conjugated Polymers Containing Palladium or Platinum

NITTO KASEI K.K. *Japanese Appl.* 62/283,129
Conjugated polymers containing Sn and optionally other metals in the main chain are produced by reacting Pd or Pt compounds, such as $((C_2H_5)_3P)_2PdCl_2$, with Sn compounds, in the presence of Cu halides and basic solvents at 0-150°C.

ELECTROCHEMISTRY

Hydrogen Evolution Cathode

JOHNSON MATTHEY P.L.C. *European Appl.* 256,673A
A cathode suitable for H₂ evolution consists of a non-ferrous metal substrate, an electrocatalyst deposit containing Pt and Ru, and a deposit of Au and/or Ag at 0.1-11 wt.% of the total of Pt and Ru metals. The cathode has enhanced poison resistance to Fe resulting from the presence of Au and/or Ag, and is especially used in a chloralkali cell.

Corrosion Resistant Electrolysis Electrodes

DAIKI ENG. K.K. *European Appl.* 261,920A
Surface activated surface alloy electrodes have a substrate coated with up to 150 μ of an alloy containing 0.01-10 at.% of one or more of Pt, Pd, Rh, Ir and Ru, 20-67 at.% of one or more of Ti, Zr, Nb and Ta, and Ni and/or Co. The electrodes have high corrosion resistance and activity, and are used for electrolysis of NaCl and H₂SO₄ aqueous solutions.

Oxygen Evolving Anode for Use in Acidic Medium

UNITED TECHNOLOGIES CORP. *U.S. Patent* 4,707,229
An anode for electrolytic O₂ generation in acidic medium has a ternary catalyst consisting of 5-25wt.% of a first platinum metal compound, 0.5-50wt.% of a valve metal compound, and the rest a second platinum group metal compound. The anode catalyst performs very well in harsh acidic environments and has good long life potential.

Electrodes for Electrochemical Cell

DOW CHEMICAL CO. *U.S. Patent* 4,731,168
Porous electrodes for an electrochemical cell consist of particulate C bonded with a thermoplastic resin, and may contain a catalyst of Pt, Pd, Rh, and Ag. The electrodes are separated by a membrane or diaphragm, and are used in a cell for production of electric power by electrogenerative halogenation or oxidation of unsaturated hydrocarbons.

Electrode for Treatment of Waste Water

KOBE STEEL K.K. *Japanese Appl.* 63/16,088
An electrode consists of Cu material covered with a Ti layer and then a Pt layer, both of controlled thickness, and both strongly bound. The electrode has improved conductivity and corrosion resistance, and is used for treatment of industrial waste water.

Insoluble Anode with Platinum Group Metal Coating

TANAKA KIKINZOKU KOGYO *Japanese Appls.* 63/24,082-87
An insoluble anode consists of a Ti substrate, optionally coated with Mo, and coated by explosive spraying of a wire or plate material of Pt, or another platinum group metal, or an alloy of Pt with another platinum group metal. The coating can be formed quickly, and an anode with large surface area, low Cl₂ overvoltage, high O₂ overvoltage, and high efficiency can be obtained, for use in the electrolysis industries.

Iridium Oxide Thin Film

HITACHI MAXELL *Japanese Appl.* 63/33,595
An Ir oxide film is deposited on a cathode or anode surface by electrolysis of an alkaline aqueous solution containing an Ir compound, and having a pH of at least 8. The Ir oxide thin film can be electrolytically produced by a simple process.

Active Alloy Catalyst for Electrochemical Cells

FUJI ELECTRIC MFG. K.K. *Japanese Appl.* 63/44,940
A catalyst for use in electrochemical cells consists of an alloy of Pt, a transition metal, preferably Fe, and a third component, preferably C. The alloy loaded Pt-Fe-C catalyst maintains high catalytic activity.

Anode for Electrochemical Peroxide Synthesis

FAIR E. UNIV.

Russian Patent 1,333,717

An anode used in electrochemical synthesis of peroxides is prepared more efficiently by coating the support with a catalyst containing (in wt.%) 20–41% Pt, 46–74% SnO₂, and 4–13% Sb₂O₃. Using this method, Pt consumption is reduced two fold, selectivity of peroxide synthesis is increased by 30%, and energy consumption is reduced by up to 68%.

ELECTRODEPOSITION AND SURFACE COATINGS

Tin-Palladium Catalyst for Electroless Deposition Processes

MCGEAN-ROHCO INC.

U.S. Patent 4,717,421

A solid Sn-Pd catalyst is prepared from a Pd halide, a Sn(II) halide, an alkali metal halide, a Sn(II) carboxylate and water. The method is used to manufacture a Sn-Pd catalyst used in electroless deposition processes. The product has superior activity to prior art catalysts and is non-toxic and easy to handle.

Palladium Chelate Plating Composition

T. KOHAMA

Japanese Appl. 62/284,082

A non-electrolytic plating composition consists of a polymer compound of a Pd chelate and a solvent. The composition is applied to the surface of a base body, which is then non-electrolytically plated with metal. The body can be partially plated for better adhesion.

Palladium Activating Solution for Electroless Plating

NEC CORP.

Japanese Appls. 63/4,072–73

A catalyst solution for electroless plating contains 0.1–1 g/l PdCl₂, HCl, SnCl₂, α , α -dipyridyl and optionally NaCl. It is used for activating insulating materials such as plastics for preparation of electroless metal plating.

Electroless Palladium-Nickel Alloy Plating Liquid

ISHIHARA YAKUHIN K.K. *Japanese Appl. 63/24,072*

An electroless plating liquid contains 0.001–0.5 mol/l of a Pd compound, 0.01–1 mol/l of a Ni compound, NH₃ and/or an amine compound, an organic compound including divalent S, and a hypophosphite and/or hydrogenated B compounds. The plating liquid has pH 5–11, and is used in the production of electronic components.

Palladium Activating Liquid for Electroless Plating

SHINKO DENKI KOGYO *Japanese Appl. 63/45,378*

An activating liquid contains more than 1 ppm/l of a Pd ammonium complex in the form of [Pd(NH₃)₄]²⁺ or [Pd(NH₃)₄]¹⁺, and an alkali metal hydroxide. The liquid is used to activate a ceramic substance prior to electroless plating.

Amorphous Palladium Plating

TONAN KINZOKU KOGYO *Japanese Appl. 63/50,491*

Amorphous Pd plating is effected from a Pd plating bath containing As, at 5 mA/cm², at 50°C with a direct current, or at 25°C with a pulse current. An amorphous Pd plating layer having a smooth surface, good corrosion resistance and containing only a very small amount of absorbed H₂ can be produced rapidly.

APPARATUS AND TECHNIQUE

Solid Electrolyte Gas Sensor

ALLIED CORP.

World Appl. 88/701A

An amperometric gas sensor consists of a Pt wire sensing electrode exposed to the ambient gas, and a reference electrode, both in electrical contact with a solid electrolyte matrix containing an alkali salt. The apparatus determines the concentration of gas constituents in air, and uses a solid electrolyte operable over a wide range of environmental conditions.

Oxygen Sensor for Air:Fuel Ratio Control

HONDA GIKEN KOGYO

U.S. Patent 4,723,521

An O₂ sensor has a sensor body with two interconnected chambers and consists of ZrO₂ with Pt electrodes attached to each chamber wall. The sensor is located in the exhaust pipe, and the signals from it are fed to a microprocessor based management system, which determines and controls the air:fuel ratio at a predetermined value.

Dielectric Probe with Interdigitated Electrodes

D.E. KRANBUEHL

U.S. Patent 4,723,908

Two interdigitated chemically resistant electrodes of Pt, Pd, Au, Ti, W, Cr or a combination of these are used in a dielectric probe for sensing electrical properties. The probe is simple for contacting thin films and coatings, and is used to monitor the dielectric properties of laminates and adhesives.

Ruthenium Alloy Probe for Liquid Helium Level Meter

AISIN SEIKI K.K.

Japanese Appl. 62/277,525

A superconductor wire of an amorphous alloy phase of Ru, Mo and P and/or B is used in the electrical resistance probe of a liquid He level meter for measuring the depth of liquid He in a vessel. The wire has excellent mechanical strength and gives decreased error due to temperature change.

Carbon Monoxide Detection Element

SHIN COSMOS DENKI K.

Japanese Appl. 63/3,247

A CO detection element consists of SnO₂ with at least one of Pt, Pd and Au in a total quantity of not more than 0.045wt.%. The element is steadily operated at not less than 250°C. A purge circuit is unnecessary for this detecting element and cost can be reduced.

Working Electrode for Anion Analysis

AGENCY OF IND. SCI. TECH. *Japanese Appl.* 63/15,152

A conductor of Pt, Pd, Rh, Ir, Ru, Au, Ag, a C material, or conductive glass is coated with a polydivinyl ferrocene thin film and used as a working electrode for potential scanning in aqueous electrolyte. The resulting current-potential curve is used to detect and analyse various anions in solution.

Hydrogen Gas Sensor Element

FUJI ELECTRIC MFG. K.K. *Japanese Appl.* 63/30,751

A H₂ gas sensor element is made by coating a spiral heat-sensitive resistor wire of Pt with γ -Al₂O₃, impregnating with Pt, and treating with Si vapour at 200–400°C. The sensor element has good selective sensitivity for H₂ gas for long periods, and is used to detect H₂ in the air in fuel cell power generating plants and H₂ engines.

Oxide Semiconductor Type Oxygen Sensor

TOYOTA JIDOSHA K.K. *Japanese Appl.* 63/52,049

An O₂ sensor device consists of an oxide semiconductor covering 2 electrodes at predetermined intervals, with a Pt or Pt/Rh catalyst around the electrodes. Positioning the catalyst in this way gives superior response while reducing the amount of catalyst used. The O₂ sensor is used to detect O₂ concentration in car exhaust gas by a change in resistance.

Dissolved Oxygen Sensor

JGC CORP. *Japanese Appl.* 63/58,148

An O₂ sensor includes an inner tube having a Pt cathode plate with a curved lower surface, a Pb anode, and an outer tube with an O₂ transmitting partitioning film. The measured current flow resulting from dissolved oxygen in the test liquid is stabilised even when heat pasteurisation is repeated, and a dissolved O₂ sensor of high strength can be obtained.

Internal Structure for Tubes to Withstand Pressure Shocks

W. SCHUBERT *German Appl.* 3,622,445

The internal structure of pressure-shock insensitive tubes or vessels comprises a mattress-shaped lining with radial springs, and a sheet metal covering such as Pt, axially disposed on the inner surface. The arrangement can be replaced simply, and is used for industrial purposes and for nuclear reactor plants.

Determination of Specific Surface Area of Platinum

MOSCOW LOMONOSOV UNIV. *Russian Patent* 1,332,195

The specific surface area of Pt dispersed on C substrates is determined by using the sample as one electrode in a three-electrode cell. An adsorbing substance is introduced, and the anode potential curve is noted and compared to that of a sample without adsorbed ions so that the number of adsorbed ions, and thus the specific surface, can be found.

Specific Surface Measurements of Supported Metal

M.P. ALEKSEEVA

Russian Patent 1,334,076

The specific surface of Pt, Rh, Ir or Ru on an Al oxide surface can be determined by impregnating the sample with H₂, and then measuring the amount of H₂ gas desorbed. The method is more accurate; the relative error being reduced 1.5–5 times.

JOINING

Improved Bonding of Metal Layers to Synthetic Surfaces

BAYER A.G.

European Appl. 255,012A

Improved bonding of Pd, Au, Ag, Ni, Co, Fe and/or Cu metal layers deposited without current on synthetic surfaces, is obtained by treating the surface with a non-etching activator composition containing a copolymer as binder. The composition is used as a printing paste in production of printed circuits.

Palladium-Silver Solder

G. ROTZER

U.S. Patent 4,718,593

A solder consisting of 11–89wt.% Pd and 11–89wt.% Ag is used to bond a metal electrode to a rough cut and unmodified semiconductor surface. Using this method a permanent bond is achieved without the need for semiconductor surface pretreatment.

Palladium Alloy for Joining Ceramics

GTE PRODUCTS CORP.

U.S. Patent 4,719,081

An alloy for joining ceramics consists of 65–98% Pd, 1–20% Ni, 0.5–20% Cr, 0.5–10% Ti or Zr, and 0–10% Mo, (all wt.%). The alloy is preferably in the form of a foil, and is used for brazing ceramic components such as SiC. The Pd provides an oxidation resistant ductile bond, and the Ti and Zr allow wetting of the ceramic surfaces.

HETEROGENEOUS CATALYSIS

Isomerisation Catalyst Containing Platinum and/or Palladium

CIE RAFFINAGE DISTR.

European Appl. 253,743A

Isomerisation of normal paraffin to isoparaffin uses a catalyst of 0.1–1wt.% Pt and/or Pd deposited on a zeolite/combined Zr/Al₂O₃ mixture, at 220–280°C and a total pressure of 2–40 bars. The activity and selectivity of the catalyst are improved by the presence of Zr.

Ruthenium Promoted Hydrogenation/Dehydrogenation Catalyst

BEROL KEMI A.B.

European Appl. 254,335A

A catalyst consists of 4–40wt.% Ni and/or Co, 0.1–5wt.% Ru as promoter, and a halide compound, on a porous oxide support of at least 50wt.% activated Al₂O₃ and/or SiO₂. The catalyst is used in hydrogenation and/or dehydrogenation reactions.

Dehalogenation Catalyst

CHIYODA CHEM. ENG. CO. *European Appl.* 255,877A

Dehalogenation of a halide involves catalytic hydrogenation of the halide at 200–1100°C, in the presence of a catalyst containing at least one platinum group metal and/or its silicide on a corrosion resistant ceramic or graphite support. The catalyst gives long life for dehalogenation of tetra- or trichlorosilane, but can also be used for other chlorides.

Combustion Catalyst for Hot Water Boiler

U. VIANI *European Appl.* 256,322A

A boiler with catalytic combustion of CH₄ for domestic H₂O heating has a container with layers of a combustion catalyst consisting of a platinum group metal supported on a granular solid. Use of low noble metal content catalysts ensures complete CH₄ combustion at low temperatures.

Platinum or Palladium Isomerisation Catalyst

INST. FRANCAIS DE PETROLE *European Appl.* 256,945A

An isomerisation catalyst preferably contains 0.05–1wt.% Pt or Pd, or 0.1–10wt.% Ni supported on a mordenite in the acid form, and is subjected to an oxychlorination process to increase the metal dispersion and activity. The catalyst is used for hydroisomerisation of a fraction rich in 4–7°C n-paraffins, to give a high octane gasoline component.

Decarbonylation Catalysts for Furan Preparation

BASF A.G. *European Appl.* 261,603A

Furan is prepared by gas phase decarbonylation of furfural at 250–400°C, in the presence of H₂ and a supported catalyst containing 0.1–10wt.% Pt and/or Rh, and 0.1–10wt.% of an alkali metal oxide, preferably Na, K and/or Cs. The catalysts give improved productivity and have a longer useful working life than prior art catalysts.

Zinc-Chromium-Palladium Catalyst for Pyrazine Preparation

BRACCO IND. CHIM S.P.A. *World Appl.* 88/189A

A pyrazine compound is prepared by reacting a diamine with a diol in the presence of a new catalyst containing Zn oxide, Zn chromate and 0.5–5wt.% PdSO₄. The catalyst has an improved lifetime, and pyrazines are obtained in high yield with good selectivity. The products are used as essences, perfumes, flavours and intermediates.

Polymer Catalyst with Trapped Precious Metals

CATALYTICA ASSOC. *World Appl.* 88/1,200A

A catalyst is prepared by intercalation of Pt, Pd, Rh, Ir, Ru or mixtures between the layers of a layered crystalline material containing P, and crosslinking the layers by reaction with a hydroxy metal complex.

Precious Metal Catalyst with Defined Metal Dispersion

DOW CHEMICAL CO. *U.S. Patent* 4,713,363

A catalyst consists of 0.45–1.0 mmol/g of Pt, Pd, Ir, Os, or Ru crystallites with a dispersion of 50–90%, on a metal oxide substrate with specified surface area and volume. The catalyst combines high metal loading with high dispersion, and can be used in hydrogenation processes or in the production of methyl methacrylate from 2-chloropropane.

Low Pressure Naphtha Reforming Catalyst

EXXON RES. & ENG. CO. *U.S. Patent* 4,719,005

A catalyst consisting of 0.1–1.2% Pt, 0.1–1.2% Re and 0.15–1.2% Ir (all wt.%) on an Al₂O₃ support is used to improve octane quality of a naphtha by reforming at ultra-low pressure and ultra-low H₂ rate. The conditions used give acceptable catalyst activity, yield stability and an optimised yield of hydrocarbons.

Palladium Catalyst for Conversion of Propylene to Allyl Acetate

SUN REFINING & MARK. *U.S. Patent* 4,732,883

A supported Pd catalyst is contacted with a 3–6C olefin in acetic acid at 55–150°C, 1–10 atm, and in the absence of O₂, to prepare an activated Pd catalyst. This catalyst is especially useful in the one-step oxidation of propylene to allyl acetate, giving high yield and selectivity under mild conditions.

Three-Way Automobile Exhaust Catalyst

NISSAN MOTOR K.K. *Japanese Appl.* 62/266,142

One or more of Pt, Pd and Rh is supported on a mixture of activated Al₂O₃ supporting rare earth metal, and rare earth metal oxide, which is then made into a slurry with Al₂O₃ sol, and coated onto a support. The catalyst produced is useful for simultaneous removal of HC, CO and NOx from automobile exhaust, and shows improved resistance to sintering of the catalytic metal.

Catalyst for Purification of o-Methylacetophene

TORAY IND. INC. *Japanese Appl.* 62/277,338

A process of catalytic hydrogenation and distillation is used to purify crude o-methylacetophene, prepared from o-toluic acid and acetic acid or acetone. The hydrogenation catalyst is Pt, Pd, Rh, Ru and Ni, and is used at 1–20wt.% of the crude material. High purity o-methylacetophene is obtained.

Preparation of Dialkylaminophenols

SUMITOMO CHEM. IND. K.K. *Japanese Appl.* 62/292,747

A Pt and/or Pd catalyst supported on activated charcoal is used in the preparation of an N,N-dialkyl-substituted aminophenol from a monoalkylaminophenol, aldehyde(s) and H₂. The product is prepared with high selectivity, and is an important intermediate of dyestuffs for heat-sensitive, pressure-sensitive paper and fluorescent dye.

Catalyst for Hydrocarbon Fuel Gas Production

KANSAI NETSUKAGAKU *Japanese Appl.* 62/294,442
A catalyst consists of platinum group metals, Fe and/or Co, and Mn oxides, on an Al_2O_3 and/or SiO_2 support. An example catalyst has the composition 0.35% Ru, 0.9% Mn₂O₃ and 5% Co on Al_2O_3 . The catalyst is used to produce a high calorie 1-4C hydrocarbon fuel gas from a mixed gas containing H₂ and CO or CO₂.

Methanol Decomposition Catalyst

MITSUBISHI GAS CHEM. K.K. *Japanese Appl.* 63/4,849
A methanol decomposition catalyst has a SiO_2 support with 0.5-5wt.% of at least one of Pt, Pd and Rh, and at least one of Mo and La with an atomic ratio of 0.01:0.5 against Pt, Pd and Rh. The catalyst has high activity, improved selectivity, and shows high quality in the methanol decomposition reaction, leading to an improved methanol utilisation coefficient.

Combustion Catalyst for Natural Gas

NIPPON SHOKUBAI KAGAKU *Japanese Appl.* 63/4,852
A combustion catalyst having 10-100g/l of a platinum group element and a refractory metal oxide on a monolithic support, is used for catalytic combustion of natural gas containing methane and lower hydrocarbons, to obtain a clean gas practically free from toxic components. The clean combustion gas is useful as a primary energy source for turbines.

Palladium Catalyst for Nitrous Oxide Removal

EBARA SOGO KENKYUSHU *Japanese Appl.* 63/7,826
N₂O in a mixed gas is decomposed and removed by contact at 250-600°C with a supported catalyst containing one or more of the metals Pd, Ni, Fe, Co and Cu, or their oxides. The catalyst can be used to remove N₂O in an effluent gas from a denitration apparatus (used for waste gas from a heavy oil combustion furnace).

Methanol Reforming Catalyst

MITSUBISHI HEAVY IND. K.K. *Japanese Appls.* 63/7,842-43
A CH₃OH reforming catalyst consists of Rh and Pt or Pd loaded on a rutile-type TiO₂ support, or an Al_2O_3 support coated with alkaline earth metal oxides. The catalyst is used to convert CH₃OH into H₂ and CO, has higher activity at lower temperatures and an extended operating life.

Alcohol Combustion Engine Exhaust Purification Catalyst

NIPPON SHOKUBAI KAGAKU *Japanese Appl.* 63/7,845
A catalyst for purifying the exhaust of an alcohol combustion engine at lower temperatures consists of uniformly dispersed Pt particles (100-500Å) on a porous inorganic oxide. The catalyst may also contain Pd and Rh, and is used to decompose unreacted alcohol, CO, hydrocarbon or aldehyde in the exhaust.

Automobile Exhaust Catalyst with Controlled Metal Placement

TOYOTA JIDOSHA K.K. *Japanese Appl.* 63/7,847
A monolithic catalyst for automobile exhaust purification is prepared in such a way that the peripheral cells are clogged, and much more Pt and Rh are loaded onto the central part. Loading of the catalyst materials on the clogged parts can be prevented, so that the catalyst has higher activity, and reduced poisoning and degradation.

Aromatic Hydrocarbon Preparation

SHOWA SHELL SEKIYU *Japanese Appl.* 63/8,342
An aromatic hydrocarbon is prepared by contacting a lower saturated hydrocarbon having 5 or less C atoms with a Zn silicate catalyst containing 0.25-1.5wt.% Pt, at 300-700°C. The catalyst can be regenerated by burning in an O₂ containing atmosphere and enables an aromatic hydrocarbon to be formed by using a cheap catalyst efficiently.

Ozone Decomposition Catalyst

NIPPON SHOKUBAI KAGAKU *Japanese Appl.* 63/12,347
A catalyst contains 0.2-5g/l of at least one element of Pt, Pd or Rh, 1-20 g/l Ce oxide, and activated Al_2O_3 , supported on a refractory three-dimensional structure. The catalyst is used for decomposing O₃ gas to O₂, and has high activity at low temperature, and good durability.

Exhaust Catalyst with Improved Resistance to Lead Poisoning

NIPPON MOLYBDENUM K.K. *Japanese Appl.* 63/20,028
A catalyst for cleaning automobile exhaust gas consists of a monolithic carrier or cordierite substrate, coated with alternate layers of activated Al_2O_3 containing Pt, Rh and/or Pd, and activated Al_2O_3 . The catalyst has improved lead poisoning resistance since poisons are trapped in the activated Al_2O_3 layer.

Platinum Group Metal Catalyst for High Calorie Gas Preparation

KANSAI NETSU KAGAKU *Japanese Appl.* 63/23,742
A catalyst for preparing high calorie gas consists of a platinum group metal, 15-25wt.% of Fe and/or Co, and MnO on a SiO_2 and/or Al_2O_3 support. The catalyst has good heat resistance and long life, and enables high calorie gas containing 2-4C hydrocarbons to be obtained easily from low calorie gas such as coke oven gas.

Catalyst Coating for Improved Combustion Efficiency

TANAKA KIKINZOKU KOGYO *Japanese Appls.* 63/32,118-19
A platinum group metal or oxide catalyst is coated on the outer surface of movable parts and on the inner surface of fixed parts which contact the gases in the combustion chamber of an internal combustion engine. A coating with good activity and durability is obtained with good fuel gas combustion rate.

Ethylene Preparation from Synthetic Gas

AGENCY OF IND. SCI. TECH. *Japanese Appl.* 63/33,342

Ethylene is prepared from synthetic gas using a Rh-Ti-Fe-Ir/SiO₂ catalyst on the upper plate of the reaction tube and an alcohol dehydrating catalyst on the lower plate, or using a mixture of the two. Reaction is carried out at 100–450°C, with H₂:CO ratio of 10:1–1:10. Using these catalysts ethylene can be synthesised selectively, in one step, and efficiently.

Filter for Diesel Exhaust Particulates

TOYOTA JIDOSHA K.K. *Japanese Appl.* 63/51,947

A honeycomb filter is made of a 3-dimensional refractory structure, coated with an inorganic oxide, then plated with a conductive Cu or Ag layer, and plated with a Pt, Pd or Rh catalyst layer. The filter has improved collection efficiency of exhaust particulates.

Combustion Exhaust Purification Catalyst

TOYOTA JIDOSHA K.K. *Japanese Appl.* 63/54,940

A combustion exhaust purification catalyst consists of a supported Rh containing perovskite type double oxide, preferably Ba_{1-x}Sr_xRhO₃, with a reversible phase transition point of 700–900°C. The catalyst has improved durability as Rh/Al₂O₃ solid solution formation is prevented, and higher activity at lower temperatures since Rh₂O₃ is deposited and Rh can be highly dispersed.

Efficient Particulate Capturing Catalytic Filters

CATALER KOGYO K.K. *Japanese Appls.* 63/65,926–27

Particulate capturing catalytic filters with high efficiency consists of a honeycomb body coated with Al₂O₃ containing a rare earth metal oxide, carrying a platinum group metal at the gas inlet side, and having selected areas Cu plated, or upstream and downstream filter units coated with Al₂O₃, carrying a platinum group metal and Cu, respectively.

Palladium Catalysts for Preparation of Dialkyl Oxalates

V.E.B. LEUNA-WERK ULBRICHT

East German Patents 249,260–62

Dialkyl oxalates are prepared by reaction of CO with a nitrite ester at 323–473K and 0.1–1 MPa, in the presence of a catalyst containing 0.1–5wt.% Pd, and optionally Cu, on an Al₂O₃ support which may be modified with other compounds. The catalysts have good stability and give high space-time yields.

HOMOGENEOUS CATALYSIS

Palladium Catalyst for Aromatic Acid Preparation

RHONE POULENC CHIMI. *European Appl.* 255,794A

An aromatic acid is prepared by contacting an aromatic halide in an organic solvent with CO, H₂O, a Pd-based catalyst, an organic base, and a Pd complexing agent, but without a transfer agent.

Phenol Oxidation Catalyst

AIR LIQUIDE L.

European Appl. 262,054A

A salt or complex of Pd, Co or Cu is used as a catalyst for oxidation of phenols in industrial wastes, especially water containing chloro- or polychlorophenols. Oxidation is effected in an aqueous medium containing alkaline carbonate, at 80–200°C, and O₂ pressure of 0.1–2 MPa, using up to 5% metal based on the wt. of phenol.

Polymer-Bound Catalysts with Improved Lifetime

JOHNSON MATTHEY P.L.C. *U.S. Patent* 4,727,050

A multi-purpose catalyst consists of a platinum group metal carboxylate, especially Rh acetate, bound to the carboxylate groups of a polymer containing no other reactive groups. Such catalysts retain the activity of the unbound platinum group metal carboxylate, and have longer effective lifetimes. They are useful for various reactions such as cyclopropanation, hydroformylation and others.

Rhodium Based Catalyst for Alcohol Homologation

UNION CARBIDE CORP.

U.S. Patent 4,727,200

A catalyst system containing Rh, Ru, Ir, and a bis(diorganophosphino)alkane is used for the reaction of an alcohol with synthesis gas to produce the next higher homologue alcohol. The reaction occurs at 50–250°C, and 100–10000 psig, and is used to produce ethanol and its precursors from methanol.

Chloropropionaldehyde Preparation Using Rhodium Catalyst

MITSUI TOATSU CHEM. INC. *Japanese Appl.* 62/277,335

Preparation of 2-chloropropionaldehyde from vinyl chloride, CO and H₂ uses a catalyst of Rh compounds with at least one kind of styrene polymer containing phosphine groups. The product is obtained in high yield and selectivity, using mild conditions.

Ruthenium Catalyst System for Ethanol Preparation

KAWASAKI STEEL K.K.

Japanese Appl. 62/298,543

Ethanol is prepared from formaldehyde, CO and H₂ by reaction in the presence of a catalyst system containing Co and Ru (at 0.01–0.1 compared to the molar number of formaldehyde) and a tertiary phosphine. The method uses no petroleum.

Selective Ethanol Preparation Using Ruthenium Catalysts

AGENCY OF IND. SCI. TECH.

Japanese Appls. 63/48,236–37

Ethanol is prepared selectively from the reaction of CO and H₂ at high temperature and pressure in a liquid medium containing either Ru and halogen compounds, or an organic phosphine oxide solution containing Ru compounds, Co compounds, and alkali metal compounds and halides.

Palladium Catalysts for Acetylene Carbo-Alkoxylation

KAZAN KIROV. CHEM. TECHN. *Russian Patent* 1,315,457

New Pd catalysts are obtained by treatment of a carbonyl-chloride complex Pd dimer with glacial CH_3COOH and triphenyl phosphine or triphenyl arsine. The proposed catalysts are used for acetylene carbo-alkoxylation, having higher selectivity than known catalysts, and have high selectivity for butyl acrylate production.

FUEL CELLS

Secondary Fuel Cell with Novel Positive Electrodes

RCA CORP.

U.S. Patent 4,721,660

A secondary fuel cell has positive electrodes consisting of Ag-In alloys having 50–55wt.% Ag and 50–45wt.% In, and negative electrodes comprising a mixture of Pd and Ru. The fuel cell charges to higher voltage at lower pressure, has lower internal resistance, and is lighter than conventional electrically regenerable fuel cells.

Platinum Alloy Catalyst for a Fuel Cell

FUJI ELECTRIC MFG. K.K. *Japanese Appl.* 63/12,349

A platinum alloy catalyst for a fuel cell is produced by applying a Pt catalyst to a support, then a metal compound such as Fe hydroxide, and heat treating in reducing and inert atmospheres to form the alloy. The Pt can be perfectly alloyed and well dispersed, giving a catalyst with good durability, high activity, and strong resistance to catalyst poison.

Platinum-Ruthenium Anode Catalysts

FUJI ELECTRIC MFG. K.K.

Japanese Appls. 63/48,760–61

Preparation of anode catalysts for phosphoric acid fuel cells involves gradual reduction of an aqueous dispersion containing Pt, Ru and a catalyst substrate, after making alkaline, heating, and adding an anti-colloid agent. The dispersion of the Ru and its degree of contact with the catalyst substrate are good.

CHEMICAL TECHNOLOGY

Production of Fine Precious Metal Particles

TANAKA KIKINZOKU KOGYO

Japanese Appls. 62/294,114–25

Fine particles of Pt, Pd, Rh, Ir, Os or Ru (M) with a narrow particle size distribution are prepared by reducing an aqueous solution of H_2MCl_6 . Using a reaction temperature of 30–150°C and a reducing gas at partial pressure of 0.5–30 kg/cm², spheroidal and well dispersed metal particles are obtained. However, with a temperature of 150–250°C and pressure of 0.1–12 kg/cm², well dispersed and crystalline metal particles are obtained.

GLASS TECHNOLOGY

Heat Resistant Platinum Alloy

TANAKA KIKINZOKU KOGYO *Japanese Appl.* 63/20,426

A platinum alloy containing Gd has excellent heat resistance, and is fused for crucibles for glass melting or high temperature sensors.

Glass Fibre Production Treatment Agent

SHINETSU CHEM. IND. K.K. *Japanese Appl.* 63/28,983

A treatment agent used in glass fibre production contains a diorganopolysiloxane, an organohydrodienepolysiloxane, and a catalytic amount of a Pt compound. The agent is useful for treating glass-sleeve, -cloth or -tape.

ELECTRICAL AND ELECTRONIC ENGINEERING

Preparation of Flexible Printed Circuit Material

BAYER A.G.

European Appl. 259,754A

Organic compounds of Pt, Pd, Rh, Au, and/or Ag are used as activators in the preparation of flexible circuits consisting of a conductive pattern deposited on a flexible substrate, such as a metal foil. Thin <10 μ or very thin 0.3–5 μ metal layers can be deposited by electroplating using this method.

Dielectric Composition for Multilayer Capacitors

LCC-CICE CIE EURO COMPOS. *European Appl.* 262,041A

Electrodes of 70wt.% Pd:30wt.% Ag alloy are used with a dielectric composition containing Nd titanate, Pb titanate, Ba titanate, Ba zirconate and Y oxide. The composition has a sintering temperature of 1280–1300°C, a dielectric constant of 75–85 at 1 MHz frequency, and is used for multilayer ceramic capacitors.

Gold-Palladium Wire Used in Forming Strong Contacts

AMERICAN TEL. & TELEG. CO. *U.S. Patent* 4,717,066

A contact portion is formed on a metal pad by bonding to a ball on one end of a Au-Pd wire, consisting of 97–99wt.% Au and 1–3wt.% Pd. The method is especially used in forming contacts to MOS semiconductor devices.

Platinum Cap Member Used in Spark Plug Manufacture

ALLIED CORP.

U.S. Patent 4,725,254

Manufacture of the centre electrode for a spark plug involves passing current through a cup-shaped Pt cap member and an extruded cylindrical inconel body, until the inconel adjacent to the junction reaches melting point. A compressive force causes the Pt cap member to fuse uniformly to the tip of the extruded centre wire, which completes the electrode.

Iridium Oxide Anode Colour Layer for Electrochromic Device

CANON K.K.

Japanese Appl. 62/262,726

An Ir oxide layer for a solid electrochromic device is produced by reactive sputtering in the presence of H₂, O₂ and Ar using a decentered substrate and sample holder. An oxide film of non-uniform density with increased surface area and moisture content is formed, which improves the colouring:discolouring ratio, and the response speed of the electrochromic device.

Ferromagnetic Thin Film for Magnetic Head Core

HITACHI K.K.

Japanese Appl. 62/279,609

A ferromagnetic thin film consists of an Fe-Mo alloy containing 0.9–5.8wt.% Mo, optionally 2wt.% or less of at least one of Pt, Pd, Rh, Ir, Os, Ru, Ag and Au, and balance Fe. The thin film has a low magnetostriction constant, high saturation magnetic flux density, and high magnetic permeability, and is used as a magnetic head core material in magnetic disk devices and VTR's.

Magnetic Recording Medium with Protective Film

SEIKO EPSON K.K.

Japanese Appl. 62/289,912

A magnetic recording medium with superior mechanical reliability and durability consists of a Co alloy magnetic layer on a treated base, with a Pd-Ni or Pd protective film, and a Rh film. The Pd-Ni and Rh films have a total thickness of 100–1000Å and protect the magnetic layer, which does not change even under high humidity.

Electrode Structure for Electric Cell

ISHIKAWAJIMA-HARIMA JUKO

Japanese Appl. 62/290,890

An electrode structure for an electric cell is made so that the conventional troublesome brazing is replaced by a simplified setting. The structure includes a Pt electrode ring prepared in the underside flat face of a bolt head made of an insulator, with wiring connected to the electrode ring buried in the bolt stem.

Magnetic Optical Material

MATSUSHITA ELEC. IND. K.K. *Japanese Appl.* 63/11,659

A magnetic optical material has an orientated film of Heusler's alloy with good magnetic optical effect. The material has at least Pt, Mn or Sb formed on a single crystal substrate with crystal structure of the NaCl or corundum type.

Electroconductive Paste Containing Palladium

MITSUBISHI METAL K.K. *Japanese Appl.* 63/13,303

An electroconductive paste consists of fine particles of magnetite coated with 30–70wt.% of a Ag-Pd alloy containing 2wt.% or more of Pd. The electroconductive paste has improved oxidation resistivity at high temperature, and is easy to manufacture.

Optical Recording Medium with Tellurium and Palladium

MATSUSHITA ELEC. IND. K.K.

Japanese Appl. 63/23,235 and 63/23,242

An optical information recording medium has first and second layers sputtered onto a substrate from composite or alloy targets of Te and Pd. High reflectivity, high sensitivity, and high weather resistance are obtained. The recording carrier is for a disc type information recording medium, used for an optical recording regenerating system.

Permanent Magnet Alloy with Improved Resistance

NIPPON GAKKI SEIZO K.K. *Japanese Appl.* 63/45,349

A permanent magnet alloy contains Fe, a small amount of platinum group element(s), B, and Y and/or rare earth element(s). The alloy has improved resistance against oxidation and corrosion, and is used for high performance electrical apparatus.

Rerecordable Optical Recording Medium

VICTOR CO. OF JAPAN *Japanese Appl.* 63/46,635

An optical recording medium which is rerecordable has a substrate supporting a thin layer containing Pd, Sn, Pb and O₂. With this medium, erasing can be carried out using a low laser power, and ageing deterioration at high temperature is prevented.

Electrically Conductive Titanium Oxide Crystal

TOYOTA CENT. RES. & DEV. *Japanese Appl.* 63/48,703

The surface of a Ti oxide crystal is divided into two areas, only one of which supports a catalyst including at least one of Pt, Pd, Rh and Ir. Each area is treated at 300–600°C in an oxidising or reducing gas atmosphere. A Ti oxide crystal having a specific area which is electrically conductive, and an area of low electrical conductivity, is obtained.

Durable Conductive Polymer Electronic Element

OMRON TATEISI ELTRN. K.K. *Japanese Appl.* 63/61,284

An electronic element has a first electrode of Pt, SnO₂ and a second Pt thin film electrode, both with a surface covering of a conductive polymer layer of polyaniline. The element is used for a battery or displayer, and has excellent durability because elution of the second electrode into the electrolyte is prevented by a sealing member.

Palladium Activation for Metal Plating Ceramics

SCHERING A.G.

German Appl. 3,632,513

Metal plating ceramic materials involves pretreatment with gaseous B halides in a glow discharge zone, immersion in aqueous solution, activation in Pd-containing solutions, and chemical deposition of metal such as Cu or Ni. High grade, accurate printed circuit boards for electronics can be produced on ceramics, with good adhesive strength.

Palladium Powder for the Microelectronics Industry

FUNK E.J. & SONS INC. *East German Patent 251,249*
Pd powder with a specific surface area is prepared by precipitating from acid Pd chloride solution using 2-10 mol% of NH_4OH and 0.5-5 mol% of a N_2H_4 solution. The Pd powder is used to produce filter pressure paste and metallisation products.

TEMPERATURE MEASUREMENT

Temperature Measuring Probe

SCHWELM ANLAGEN *German Appl. 3,639,408*
A temperature measuring probe includes a Pt wire wound on a non-conducting carrier plate; both of which are embedded in an enamel layer. The probe is simple to produce, efficient, and reliable, and is used for chemical apparatus.

MEDICAL USES

Lipophilic Platinum Complexes as Anti-Cancer Agents

EFAMOL LTD. *European Appl. 257,939A*
New complexes with anti-cancer effects consist of derivatives of platinum group metals, preferably Pt, with lipophilic residues, which aid transport of the metal across body cell membranes. The complexes are more lipophilic than cisplatin, and therefore show anti-cancer effects at lower dosages, resulting in less side effects.

New Riboflavin Diamine Platinum Anti-Cancer Agent

Y. KIDANI *European Appl. 261,044A*
A new riboflavin diamine Pt complex is prepared from the reaction of the riboflavin or its nucleotide with the dinitrato Pt (II) diamine complex. The complex is used for anti-cancer and anti-leukemia agents.

New Platinum Anti-Tumour Agents

ASTA PHARM. A.G. *European Appl. 262,498A*
New Pt indole-diamine complexes are useful as anti-tumour agents with a high binding affinity for oestrogen receptors. They are especially useful for treating mammary carcinomas; in an example a dose of 20 mg/kg gave 77-89% inhibition of MXT carcinoma in mice after 6 weeks.

Iridium Oxide Coated Electrodes

EIC LABORATORIES INC. *U.S. Patent 4,717,581*
Ir oxide coated electrodes for a neural stimulator are made by immersing a metal electrode in a solution containing a chloroiridate-alcohol complex, drying, and annealing. The Ir oxide layer permits charge densities of up to 10 mC/cm² for cathodic or anodic polarities without water electrolysis.

Generation of Iridium-191 for Use in Angiography

CHILDREN'S MED. CENT. *U.S. Patent 4,729,380*
Apparatus for generating Ir-191 m includes a generator column having a resin loaded with a mixed solution of $\text{K}_2(\text{OsO}_2 \cdot (\text{OH})_2\text{Cl}_2)$ and $\text{K}_2(\text{OsO}_2\text{Cl}_4)$. The Ir-191 m is used in first pass angiography to detect cardiac defects in patients. The angiography can be performed with minimal interfering background radiation, and minimal exposure to toxic Os.

Deposition of Iodine-125 on a Substrate for Medical Use

MIDI-PHYSICS INC. *U.S. Patent 4,729,903*
Substrates such as charcoal impregnated with Pt, graphite ribbon impregnated with Ag, and Ag wire are contacted with Xe-125 gas, which decays to deposit at least 1 microcurie of I-125 gas as a solid on the surface. The substrate can then be used in bone densitometers and diagnostic devices such as portable units for taking X-rays or for use in radiation therapy.

Low Toxicity Platinum Anti-Tumour Agents

BRISTOL MYERS CO. *U.S. Patent 4,739,087*
Dichloro Pt complexes are treated with the Ag (II) salt of a desired ligand, such as 2-sulphobenzoate or 3-ketoglutarate, to prepare new 1,2-diaminocyclohexane Pt (II) compounds. The compounds are anti-tumour agents with improved solubility, stability, and activity against experimental murine malignancies, and have minimal toxicity.

Thermal Tip Catheter with Palladium Catalyst

U.S. DEPT. HEALTH & HUMAN *U.S. Patent Appl. 07/026,540*
A thermal tip catheter consists of a catheter body with a catalytic thermal tip at its working end. A catalyst such as Pd sponge is located within the chamber formed between the metallic tip and the end of the inner tubing, with a thermocouple positioned here also to monitor the tip temperature. The catheter is used as a surgical device for antiooplasty.

New Platinum Complexes for Use as Anti-Cancer Agents

CHUGAI PHARMACEUTICAL K.K. *Japanese Appls. 62/298,596 and 63/10,724-26*
New complexes containing Pt and 1-(2-aminoethyl)pyrrolidine or 2-aminomethylpyrrolidine are used as anti-cancer agents. The products have higher anti-tumour activity than cisplatin and carboplatin, and combine with plasma protein more weakly than cisplatin. In animal tests they are effective against colon 26 carcinoma and some leukemias.

The New Patents abstracts have been prepared from material published by Derwent Publications Limited.